Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Endothelial Interfaces – Master Gatekeepers of the Cardiovascular System SYLVIA ANN JUNGHANS, Los Alamos National Laboratory, LUKA POCIVAVSEK, University of Pittsburgh, NOUREDDINE ZEBDA, KONSTANTIN BIRUKOV, University of Chicago, MARY JO WALTMAN, JAROSLAW MAJEWSKI, Los Alamos National Laboratory — Endothelial cells, master gatekeepers of the cardiovascular system, line its inner boundary from the heart to distant capillaries constantly exposed to blood flow. Inter-endothelial signaling and the monolayer's adhesion to the underlying collagen rich basal lamina are key in physiology and disease. Using neutron scattering, we report the first-ever interfacial structure of endothelial monolayers under dynamic flow conditions mimicking the cardiovascular system. Endothelial adhesion strength (defined as the separation distance l between the basal cell membrane and solid boundary) is explained using developed interfacial potentials and intra-membrane segregation of specific adhesion proteins. Our method provides a powerful tool for the biophysical study of cellular layer adhesion strength in living tissues.

Sylvia Ann Junghans
Los Alamos National Laboratory

Date submitted: 15 Nov 2013 Electronic form version 1.4